What is claimed is:

1. A silicon optoelectronic device comprising:

an n- or p-type silicon-based substrate;

an optoelectronic device portion including

a doped region doped with a dopant of the opposite type to the substrate on a portion of the substrate, the doped region provided to emit and absorb light, and

a plurality of semiconductor material regions formed on a rear surface of the substrate,

wherein at least one portion of the plurality of semiconductor material regions and the doped region form a stack structure,

the semiconductor material regions adjacent to the substrate have the opposite conductivity type to the substrate, and

the neighbouring semiconductor material regions have the opposite conductive types to each, thereby providing a built-in transistor having at least two steps;

a switching portion formed on one side of the optoelectronic device portion and shared with the substrate, the switching portion selectively controlling emission and detection of light in the optoelectronic device portion; and

an electrode structure that performs at least one of supplying an electrical signal to the optoelectronic device portion and switching portion for

controlling emission and detection of light, and outputting a light detection signal.

2. The silicon optoelectronic device as claimed in claim 1, wherein the electrode structure comprises:

when a semiconductor material region positioned at the outermost side of the portion of the optoelectronic device portion having the stack structure is a first semiconductor material region, and a semiconductor material region adjacent to the inside of the first semiconductor material region is a second semiconductor material region, a first gate electrode electrically connected to the second semiconductor material region;

a first electrode electrically connected to the doped region; and

a second electrode electrically connected to the first semiconductor material region.

3. The silicon optoelectronic device as claimed in claim 2, wherein the first electrode is a transparent electrode formed on the doped region.

4. The silicon optoelectronic device as claimed in claim 2, wherein the electrode structure further comprises:

an insulating film formed on a portion of the second semiconductor material region; and

a high resistance material layer, on which the first gate electrode is

formed, formed on the insulating film and the second semiconductor material region,

wherein the first gate electrode electrically connects with the second semiconductor material region on a narrow region by the insulating film, with the high resistance material layer is between the first gate electrode and the second semiconductor material region.

5. The silicon optoelectronic device as claimed in claim 1, wherein the plurality of semiconductor material regions are deeper than the doped region.

6. The silicon optoelectronic device as claimed in claim 1, wherein the switching portion has a metal-oxide-semiconductor field effect transistor (MOSFET) structure,

wherein the electrode structure further comprises a second gate electrode and third and fourth electrodes, all of which are provided on the switching portion, and

wherein one of the third and fourth electrodes is electrically connected to the doped region.

7. The silicon optoelectronic device as claimed in claim 1, wherein a gap between the boundaries of the base and emitter on the side of the collector is narrow enough.

8. The silicon optoelectronic device as claimed in claim 2, wherein the plurality of semiconductor material regions are formed on the rear surface of the substrate by injecting a dopant deeper than the dopants for the doped region.

9. The silicon optoelectronic device as claimed in claim 3, wherein the plurality of semiconductor material regions are formed on the rear surface of the substrate by injecting a dopant deeper than the dopants for the doped region.

10. The silicon optoelectronic device as claimed in claim 4, wherein the plurality of semiconductor material regions are formed on the rear surface of the substrate by injecting a dopant deeper than the dopants for the doped region.

11. A silicon optoelectronic device comprising:

an n- or p-type silicon-based substrate;

an optoelectronic device portion including

a doped region doped with a dopant of the opposite type to the substrate on a portion of the substrate, the doped region provided to emit and absorb light; and

a semiconductor material region formed on a portion of a rear surface of the substrate, the semiconductor material region has the opposite conductivity type to the substrate and forms a stack

structure with the doped region so that the optoelectronic device has a built-in one-step transistor;

a switching portion formed on one side of the optoelectronic device portion and on the substrate, the switching portion selectively controlling emission and detection of light in the optoelectronic device portion; and

an electrode structure for providing at least one of supplying an electrical signal to the optoelectronic device portion and the switching portion for controlling emission and detection, and outputting a light detection signal.

12. The silicon optoelectronic device as claimed in claim 11, wherein the electrode structure comprises:

a first gate electrode electrically connected to the substrate;

a first electrode electrically connected to the doped region; and

a second electrode electrically connected to the semiconductor material region.

13. The silicon optoelectronic device as claimed in claim 12, wherein the first electrode is a transparent electrode formed on the doped region.

14. The silicon optoelectronic device as claimed in claim 11, wherein the semiconductor material region is thicker than the doped region.

15. The silicon optoelectronic device as claimed in claim 11, wherein the switching portion has a metal-oxide-semiconductor field effect transistor (MOSFET) structure,

wherein the electrode structure further comprises a second gate electrode and third and fourth electrodes, all of which are provided on the switching portion, and

wherein one of the third and fourth electrodes is electrically connected to the doped region.

16. The silicon optoelectronic device as claimed in claim 15, wherein the other one of the third and fourth electrodes, and the second electrode act as oppositely charged electrodes.

17. The silicon optoelectronic device as claimed in claim 11, wherein the switching portion has a bipolar junction transistor structure, and

wherein the electrode structure further comprises base, emitter, and collector electrodes provided in the switching portion.

18. The silicon optoelectronic device as claimed in claim 17, wherein the switching portion is formed by forming a base on the substrate by doping, forming an emitter on the base by doping, and forming a collector on one side of the base by doping.

19. The silicon optoelectronic device as claimed in claim 18,

wherein a gap between the boundaries of the base and emitter on the side of the collector is narrow enough.

20. An image input/output device comprising a silicon optoelectronic device panel having a plurality of silicon optoelectronic devices capable of inputting and outputting image arranged on an n- or p-type silicon based substrate in a two-dimensional array, each of the plurality of silicon optoelectronic devices comprising:

an optoelectronic device portion including

a doped region doped with a dopant of the opposite type to the substrate on a portion of the substrate, the doped region provided to emit and absorb light, and

a plurality of semiconductor material regions formed on the rear surface of the substrate,

wherein a stack structure is formed between at least one portion of the plurality of semiconductor material regions and the doped region,

the semiconductor material regions adjacent to the substrate have the opposite conductivity type to the substrate, and

the neighbouring semiconductor material regions have the opposite conductive types to each other so that the optoelectronic device portion has a built-in transistor having at least two steps;

a switching portion formed on one side of the optoelectronic device portion and on the substrate, the switching portion selectively controlling

emission and detection of light in the optoelectronic device portion; and

an electrode structure performs at least one of supplying an electrical signal to the optoelectronic device portion and switching portion for controlling emission and detection of light to the optoelectronic device portion and switching portion, and outputting a light detetion signal, thus allowing for input and output of image through the same silicon optoelectronic device, and

a pattern on the electrode structure to selectively control the input and output of an image to and from the silicon optoelectronic device panel on a pixel-by-pixel basis.

21. The image input/output device as claimed in claim 20, wherein the electrode structure comprises:

when a semiconductor material region positioned at the outermost side of the portion of the optoelectronic device portion having the stack structure is a first semiconductor material region, and a semiconductor material region adjacent to the inside of the first semiconductor material region is a second semiconductor material region, a first gate electrode electrically connected to the second semiconductor material region;

a first electrode electrically connected to the doped region; and

a second electrode electrically connected to the first semiconductor material region.

22. The image input/output device as claimed in claim 21, wherein

the first electrode is a transparent electrode formed on the doped region.

23. The image input/output device as claimed in claim 21, wherein the switching portion has a metal-oxide-semiconductor field effect transistor (MOSFET) structure,

wherein the electrode structure further comprises a second gate electrode and third and fourth electrodes, all of which are provided on the switching portion, and

wherein one of the third and fourth electrodes is electrically connected to the doped region.

24. The image input/output device as claimed in claim 23, wherein the other one of the third and fourth electrodes, and the second electrode act as oppositely charged electrodes.

25. The image input/output device as claimed in claim 21, wherein the switching portion has a bipolar junction transistor structure, and

wherein the electrode structure further comprises base, emitter, and collector electrodes provided in the switching portion.

26. The image input/output device as claimed in claim 25, wherein the switching portion is formed by forming a base on the substrate by doping, forming an emitter on the base by doping, and forming a collector on one side of the base by doping.

27. The image input/output device as claimed in claim 26, wherein a gap between the boundaries of the base and emitter on the side of the collector is narrow enough.

28. The image input/output device as claimed in claim 21, wherein the electrode structure further comprises:

an insulating film formed on a portion of the second semiconductor material region; and

a high resistance material layer, on which the first gate electrode is formed, formed on the insulating film and the second semiconductor material region,

wherein the first gate electrode is electrically connected with the second semiconductor material region through the insulating film, with the high resistance material layer being between the first gate electrode and the second semiconductor material region.

29. The image input/output device as claimed in claim 20, wherein the plurality of semiconductor material regions are formed on the rear surface of the substrate by injecting a dopant deeper than dopants for the doped region.

30. The image input/output device as claimed in claim 20, wherein in the silicon optoelectronic device panel, each pixel has at least three

silicon optoelectronic devices for emitting and receiving light corresponding thereto.

31. The image input/output device as claimed in claim 30, wherein the at least three silicon optoelectronic devices emit and detect different wavelengths of light for representing a color image.

32. The image input/output device as claimed in claim 30, further comprising a color filter on the front of the silicon optoelectronic device panel.

33. The image input/output device as claimed in claim 20, further comprising a color filter on the front of the silicon optoelectronic device panel.

34. The image input/output device as claimed in claim 30, wherein the image input/output device is responsive to an optical remote control.

35. The image input/output device as claimed in claim 20, wherein the image input/output device is responsive to an optical remote control.

36. An image input/output device comprising a silicon optoelectronic device panel having of a plurality of silicon optoelectronic devices, capable of inputting and outputting images, arranged on an n- or p-

type silicon based substrate in a two-dimensional array, each of the plurality of silicon optoelectronic devices comprising:

an n- or p-type silicon-based substrate;

an optoelectronic device portion including

a doped region doped with a dopant of the opposite type to the substrate on a portion of the substrate, the doped region provided to emit and absorb light, and

a semiconductor material region formed on a portion of a rear surface of the substrate, the semiconductor material region has the opposite conductivity type to the substrate and forms a stack structure with the doped region so that the optoelectronic device has a built-in one-step transistor;

a switching portion formed on one side of the optoelectronic device portion and on the substrate, the switching portion selectively controlling emission and detection of light in the optoelectronic device portion; and

an electrode structure for providing at least one of supplying an electrical signal to the optoelectronic device portion and the switching portion for controlling emission and detection, and outputting a light detection signal.

37. The image input/output device as claimed in claim 36, wherein the electrode structure comprises:

a first gate electrode electrically connected to the substrate;

a first electrode electrically connected to the doped region; and

a second electrode electrically connected to the semiconductor material region.

38. The image input/output device as claimed in claim 37, wherein the first electrode is a transparent electrode formed on the doped region.

39. The image input/output device as claimed in claim 37, wherein the switching portion has a metal-oxide-semiconductor field effect transistor (MOSFET) structure,

wherein the electrode structure further comprises a second gate electrode and third and fourth electrodes, all of which are provided on the switching portion, and

wherein one of the third and fourth electrodes is electrically connected to the doped region.

40. The image input/output device as claimed in claim 39, wherein the other one of the third and fourth electrodes, and the second electrode act as oppositely charge electrodes.

41. The image input/output device as claimed in claim 37, wherein the switching portion has a bipolar junction transistor structure, and

wherein the electrode structure further comprises base, emitter, and collector electrodes provided in the switching portion.

42. The image input/output device as claimed in claim 41, wherein the switching portion is formed by forming a base on the substrate by doping, forming an emitter on the base by doping, and forming a collector on one side of the base by doping.

43. The image input/output device as claimed in claim 42, wherein a gap between the boundaries of the base and emitter on the side of the collector is narrow enough.

44. The image input/output device as claimed in claim 36, wherein the semiconductor material region is formed on the rear surface of the substrate by injecting a dopant deeper than dopants for the doped region.

45. The image input/output device as claimed in claim 36, wherein in the silicon optoelectronic device panel, each pixel has at least three silicon optoelectronic devices for emitting and detecting light corresponding thereto.

46. The image input/output device as claimed in claim 45, wherein the at least three silicon optoelectronic devices emit and detect different wavelengths of light for representing a color image.

47. The image input/output device as claimed in claim 46, further comprising a color filter on the front of the silicon optoelectronic device panel.

48. The image input/output device as claimed in claim 45, further comprising a color filter on the front of the silicon optoelectronic device panel.

49. The image input/output device as claimed in claim 45, wherein the image input/output device is responsive to an optical remote control.

50. The image input/output device as claimed in claim 36, wherein the image input/output device is responsive to an optical remote control.